

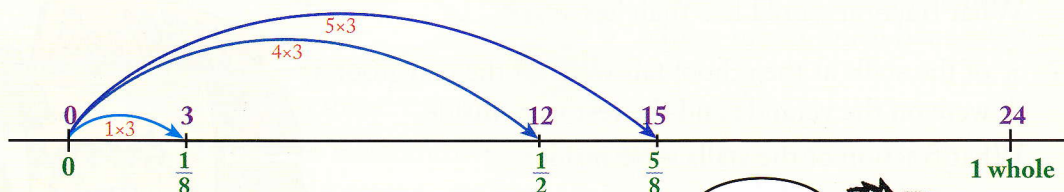
We are learning to find fractions of whole numbers.



Fraction equipment.

Example

Pere paid \$24 for a computer game on an on-line auction. Later he resold it for $\frac{5}{8}$ of what he paid for it. For how much did he sell it?



$$\frac{1}{8} \text{ of } 24 = 3$$

$$\frac{4}{8} \text{ of } 24 = \frac{1}{2} \text{ of } 24 = 12$$

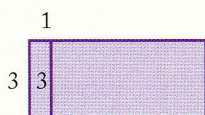
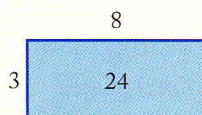
$$\frac{5}{8} = \frac{4}{8} + \frac{1}{8}$$

$$\text{So } \frac{5}{8} \text{ of } 24 = 3 + 12 = 15$$

Double number lines



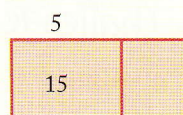
or



and



=



$$\frac{1}{8} \text{ of } 24 = 3$$

and

$$\frac{4}{8} \text{ of } 24 = 12$$

so

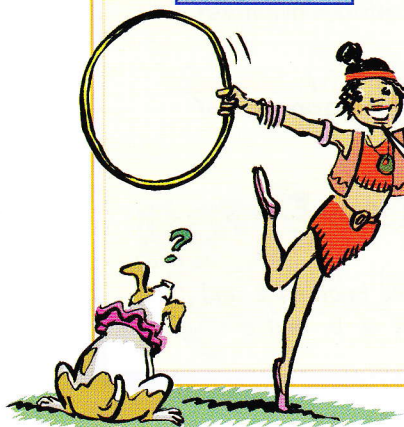
$$\frac{5}{8} \text{ of } 24 = 15$$

You need to know your multiplication facts, factors and common multiples to work these out.

$$\frac{5}{8} = \frac{1}{2} + \frac{1}{8}$$

$$\text{So } \frac{5}{8} \text{ of } 24 = 12 + 3 = 15$$

Arrays



Activity



- 1 Explain using a double number line or array how to find the answers to these.
- a 5 sixths of 42 m b 2 fifths of \$125 c 3 quarters of 80 kg
d 3 eighths of 64 cm e $\frac{7}{10}$ of 50 g f $\frac{2}{7}$ of 63 ml
g $\frac{5}{9}$ of \$45 h $\frac{5}{12}$ of 36 m
- 2 At quiz night, everyone had to find their seat number by answering a question. Work out which seat numbers these people had. Explain your thinking.
- a Jaz 1 sixth of 144 b Matt 3 quarters of 108
c Paikea 2 thirds of 72 d Mira $\frac{1}{2}$ of 386 e Raj $\frac{2}{5}$ of 90
f Ye $\frac{5}{8}$ of 96 g Sione $\frac{6}{7}$ of 105 h Ann $\frac{2}{9}$ of 189

3 Challenge

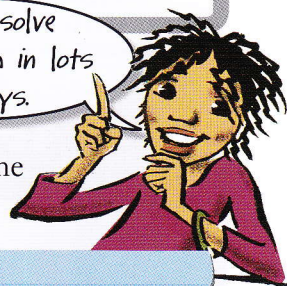
Jake's rugby team scored 140 points last season.

- a How many points did each of these boys score?
Jake scored 1 fifth of the points. Michael scored 1 seventh of the points. Aaron scored $\frac{3}{10}$ of the points.
b How many points did the rest of the team score?
c What fraction of the points did the rest of the team score?
d What do $\frac{1}{5}$, $\frac{1}{7}$, $\frac{3}{10}$ and the fraction you found in part c add up to? Explain your thinking.
e What knowledge did you need to know to be able to work out the answers to parts a to d?



- 4 There are 40 minutes in a netball game. Aroha was injured 4 fifths of the way though the game. Theo, Hyk and Jerry worked out how many minutes into the game this was.

You can solve this problem in lots of ways.



$$\begin{aligned} \frac{1}{5} \text{ of } 40 &= 40 \div 5 \\ &= 8 \\ \text{So } \frac{4}{5} \text{ of } 40 &= 4 \times 8 \\ &= 32 \text{ minutes} \end{aligned}$$

● Theo's way

or

$$\begin{aligned} \frac{1}{5} \text{ of } 40 &= 40 \div 5 \\ &= 8 \\ \frac{4}{5} &= 1 - \frac{1}{5} \\ \frac{4}{5} \text{ of } 40 &= 40 - 8 \\ &= 32 \text{ minutes} \end{aligned}$$

● Hyk's way

or

$$\begin{aligned} \frac{4}{5} &= 0.8 \\ \frac{4}{5} \text{ of } 40 &= 0.8 \times 40 \\ &= 32 \text{ minutes} \end{aligned}$$

● Jerry's way

Explain the strategy used by each to a partner. Which way do you think is most efficient and why?

5 Use an efficient mental strategy to find the answers to these.

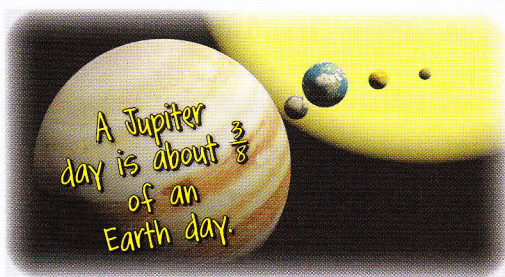
- a $\frac{3}{8}$ of 320 b $\frac{2}{7}$ of 140 m c $\frac{2}{3}$ of \$240 d $\frac{7}{8}$ of 240 cm
 e $\frac{3}{8}$ of 192 kg f $1\frac{1}{2}$ of 12 cm g $1\frac{1}{4}$ of 36 km h $4\frac{2}{5}$ of \$60

6 Find the answers to these by changing the decimals to fractions. Record how you did each.

- a 0.5×18 b 0.25×24 c 0.75×32 d 0.75×60 e 0.2×65

7 Find the answers to these mentally. Record your thinking.

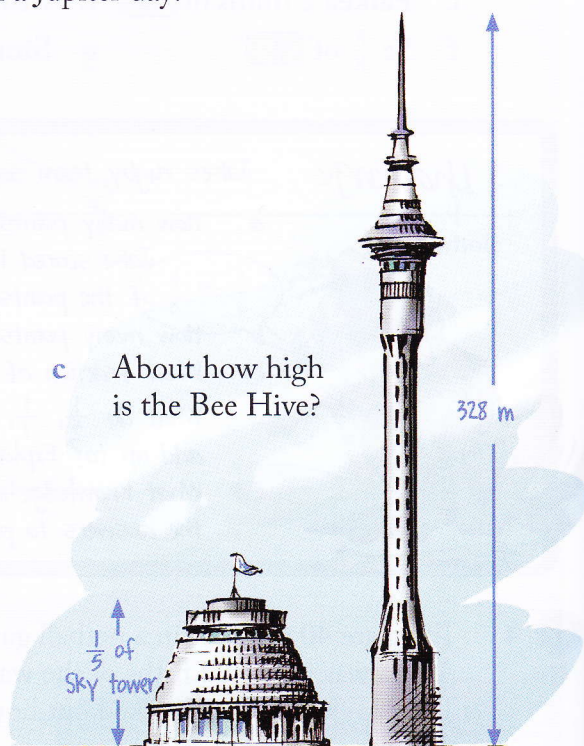
- a About how many hours are there in a Jupiter day?



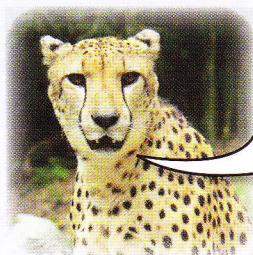
- b Out of 168 suitable donors, about how many will donate organs?



- c About how high is the Bee Hive?



- d About how heavy is the cheetah?



"I weigh about 5 twelfths the weight of the tiger."

"I weigh about 168 kg."

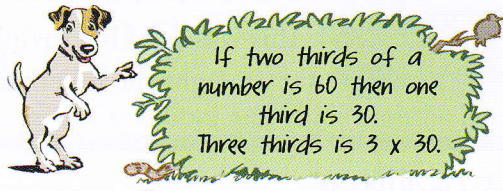


8 Write true or false for these. Justify your answer

- a $\frac{3}{4}$ of 60 $>$ $\frac{1}{2}$ of 94 b $\frac{1}{3}$ of 81 $<$ $\frac{1}{4}$ of 104 c $\frac{3}{5}$ of 110 $>$ $\frac{5}{8}$ of 96
d $\frac{5}{6}$ of 48 $<$ $\frac{5}{9}$ of 63 e $\frac{4}{7}$ of 77 $>$ $\frac{7}{12}$ of 72 f $\frac{5}{6}$ of 120 $<$ $\frac{9}{11}$ of 132

9 What is the number if

- a two thirds of the number is 20?
b one quarter of the number is 15?
c 30 is five sixths of the number?
d 16 is four sevenths of the number?



10 Find the missing amount. Show how you did each.

- a $\frac{3}{4}$ of $\boxed{?}$ = 45 b $\frac{3}{5}$ of $\boxed{?}$ = 51 c $\frac{5}{8}$ of $\boxed{?}$ = 60 d $\frac{3}{14}$ of $\boxed{?}$ = 15
e $\boxed{?}$ of 81 = 27 f $\boxed{?}$ of 35 = 21 g $\boxed{?}$ of 144 = 96

- 11 George had \$64 and Panu had \$144.
They both spent a fraction of their money on playing games at Time Out.
They both spent the same amount of money.
Write down four more statements like Millee's.
Write an equation for each.



12 Find the answers to these.

- a Ben took \$56, which was $\frac{7}{12}$ of his savings, out of his bank account to buy rollerblades. How much did he have in the bank before he took out the money?
- b Billie bought a different pair of rollerblades for \$64. This was $\frac{8}{15}$ of her savings. Before they bought the rollerblades, who had more savings? By how much?



13 Challenge

When Uncle John retired from work he received \$34 000 as a bonus. He decided to split the money between his three nieces.

Peta got half of the money because she was the eldest, Vanya got a ninth because she was the youngest and Lily got a third.

The children's mother said it could be worked out like this.

I will loan you another \$2000 to make \$36 000.

Peta then gets $\frac{1}{2}$ of \$36 000 which is \$18 000.

Vanya gets $\frac{1}{9}$ of \$36 000 which is \$4000.

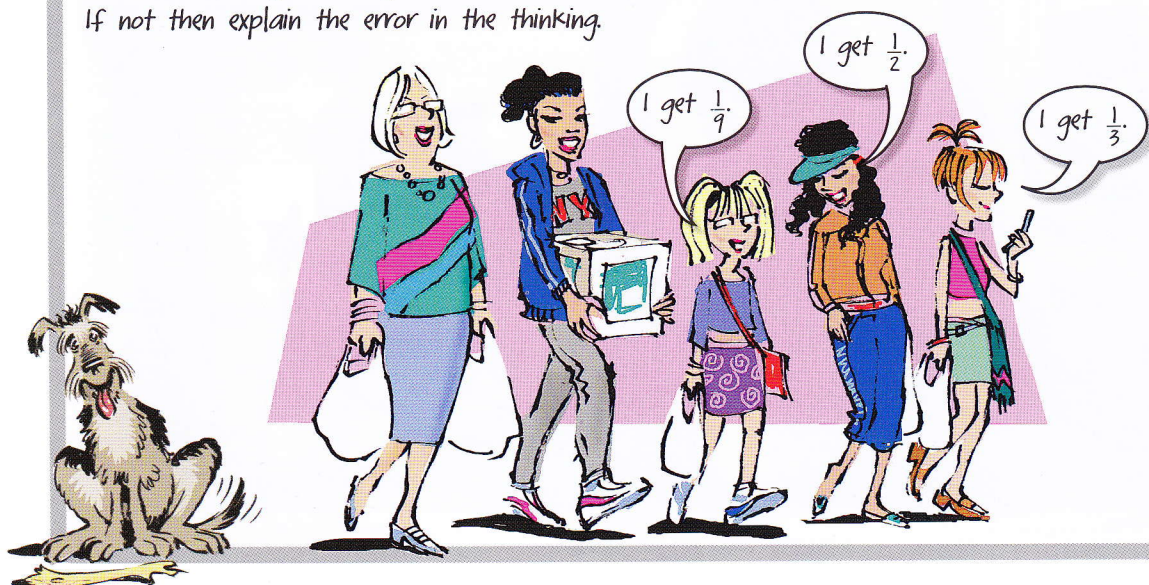
Lily gets $\frac{1}{3}$ of \$36 000 which is \$12 000.

$\$18\,000 + \$4\,000 + \$12\,000 = \$34\,000$

That now leaves the \$2000 that I loaned you to give back.

Does each child get the right amount of money?

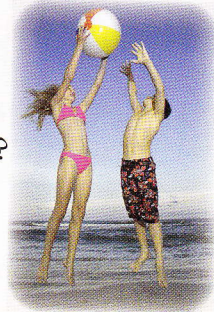
If not then explain the error in the thinking.



School census



Nadia's school carried out a school-wide census to collect some information about its pupils. There are 312 pupils in the school.



- 1 If two thirds of the pupils in the school have a brother or a sister, how many pupils have more than one child in their family?
- 2 Seventeen twenty-fourths of the pupils in the school had a holiday away from home last year.
How many pupils went away on holiday?
- 3 Five twelfths of the pupils live within 2 km of the school and three eighths live more than 4 km from the school.
How many pupils live from 2 km to 4 km of the school?
- 4 Five sixths of the pupils played touch rugby and seven eighths of the pupils played soccer at school in the last month.
Which game was played by more pupils? How many more?
- 5 Of the 28 pupils in Nadia's class, two sevenths have only a pet dog, a quarter have only a pet cat and three fourteenths have more than one pet.
 - a How many pupils have no pets?
 - b What fraction of pupils have one or more pets?

Puzzles

1 Did you know ...?

Copy this diagram into your book.



$\overline{224}$	$\overline{55}$	$\overline{182}$	$\overline{182}$	$\overline{204}$	$\overline{98}$	$\overline{80}$	$\overline{20}$	$\overline{32}$	$\overline{204}$	$\overline{78}$
	A									
$\overline{182}$	$\overline{36}$	$\overline{78}$	$\overline{182}$	$\overline{204}$		$\overline{66}$	$\overline{32}$	$\overline{182}$	$\overline{12}$	
$\overline{182}$	$\overline{12}$	$\overline{204}$	$\overline{32}$	$\overline{98}$		$\overline{80}$	$\overline{204}$	$\overline{204}$	$\overline{182}$	

Put the letter beside each question above it's answer. The first one has been done for you.

A $\frac{2}{3}$ of 54 = 36	W $\frac{6}{11}$ of 121	I $\frac{4}{15}$ of 120	R $\frac{1}{8}$ of 112
U $\frac{11}{30}$ of 150	H $\frac{3}{14}$ of 56	E $\frac{17}{20}$ of 240	L $\frac{5}{24}$ of 96
F $\frac{5}{9}$ of 144	T $\frac{13}{25}$ of 350	B $\frac{7}{10}$ of 320	S $\frac{13}{16}$ of 96

- 2 A bath was $\frac{1}{5}$ full. Stevie added 30 litres and then it was $\frac{1}{2}$ full. How much does the bath hold?

